

**ATTACHMENT**  
**American River Common Features Project, Natomas Element**  
**Natomas Cross Canal Levee Improvements**  
**Information for Section 104 Credit**

**Project Description**

The overall objective of the Natomas Cross Canal South Levee Phase 1 Improvements (NCC Phase 1 Improvements) is to address through-seepage and underseepage potential in the westernmost 12,500 feet of the Natomas Cross Canal (NCC) south levee (Figure 1) so as to reduce the risk of flooding to developed areas in the Natomas Basin.

To achieve this project objective, SAFCA considered the various levee treatment alternatives and determined that some could be effective in remediating seepage potential in the NCC Phase 1 Improvements levee segment while others would be ineffective because of site-specific conditions identified during preliminary geotechnical investigations (Kleinfelder 2006). Based on the results of these preliminary geotechnical investigations and a preliminary comparison of costs and environmental constraints (Wood Rodgers 2006), SAFCA is proposing to address through-seepage and underseepage in the NCC Phase 1 Improvements levee segment through the construction of a cutoff wall.

Cutoff walls can be constructed by a number of methods to suit site conditions and schedule requirements. The most common methods include the installation of cutoff walls consisting of a soil-cement-bentonite (SCB) mix or a soil-bentonite (SB) mix using conventional trench methods, deep soil mixing (DSM) or trench remixing deep (TRD), and interlocking steel sheet piles. Additionally, cutoff walls can be constructed at either the levee centerline or the levee waterside toe. For either method, the available working area generally must be about 30 feet wide.

Construction of a conventional slurry cutoff wall through the center of the levee typically requires that the existing levee be degraded as much as one-third of the levee height to prevent hydraulic fracturing. The top of the levee must then be reconstructed using suitable material. Levee excavation and reconstruction quantities are higher with a waterside cutoff wall than with centerline installation; however, the square footage of a waterside cutoff wall is lower.

A review of each of the three project reaches was performed to determine their suitability for a waterside cutoff wall. To meet the project objective of constructing the proposed improvements in 2007, it was considered necessary for each reach of the levee to have a bench above the OHWM that is relatively free of large oak trees and other plant species with habitat value for native species. A visual survey of the project site was conducted, and none of the project reaches was observed to meet these criteria. While a bench of limited width is present on the water side of the existing levee, enlarging this bench would require cutting away the waterside levee slope above the level of the bench and reconstructing the waterside of the levee following cutoff wall construction. This would require removing the existing riparian vegetation, increasing the environmental impacts and costs of the project and requiring additional time to conduct environmental permitting. For these reasons, SCB cutoff walls through the levee crown were determined to be the most feasible design option. Figure 2 is a schematic representation of this design.

### **Design and Construction Costs**

SAFCA estimates that the total cost to design and construct the NCC Phase I Improvements will be \$35,395,774. These costs are displayed in Table 1.

<b>Table 1 – Design and Construction Costs</b>		
Element	% of Total Cost	Cost
Construction		\$17,666,000
Contingency	25%	4,416,500
Escalation	6%	1,059,960
Change Orders	10%	1,766,600
Sub-Total		24,909,060
Environmental Mitigation	2%	523,090
Planning & Engineering	25%	6,227,265
Construction Management	10%	2,490,906
Regulatory Permitting	5%	1,245,453
Total		35,395,774

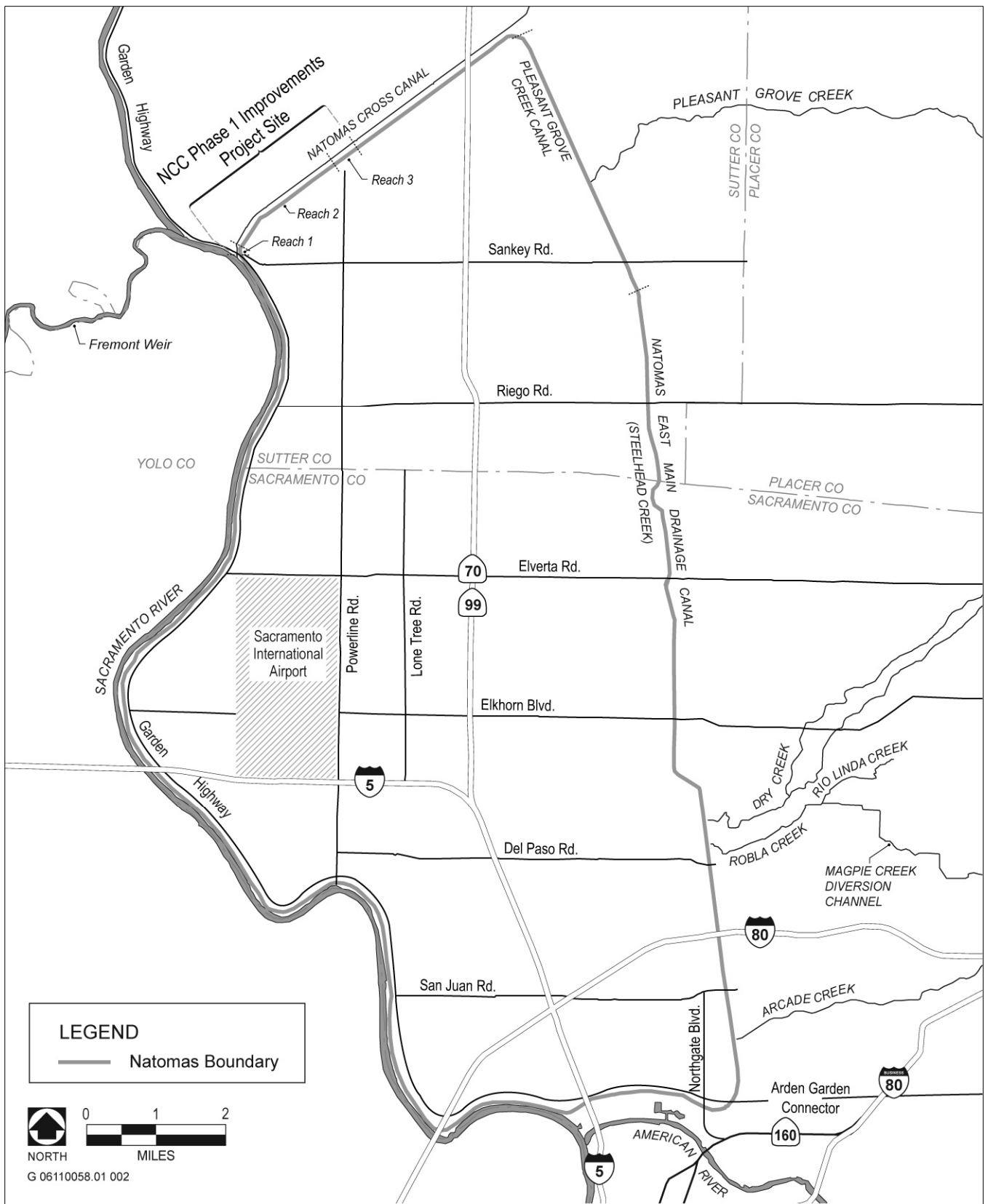
### **Environmental Effects**

As indicated in Table 2, the NCC Phase 1 Improvements would result of a number of significant construction related impacts to geology and soils, water resources, fish and wildlife, cultural and paleontological resources, transportation, air quality, noise and hazardous materials. With appropriate mitigation, all of these impacts would be reduced to a less than significant level.

### **Economics**

The NCC south levee protects urban development in the southern portion of the Natomas Basin, including 23,736 residential structures, 133 multi-family structures, 578 commercial structures, 187 industrial structures, and 406 public structures, including the Sacramento International Airport. These structures have an estimated replacement value of approximately \$10 billion. A breach of the NCC south levee would put most of these structures under five to ten feet or more of flood water, causing a loss of approximately 70 percent of the value of these structures in a single flood event. Based on current estimates of the likelihood of failure along this reach of the levee system, this equates to expected annual damages of approximately \$70 million. The NCC Phase I Improvements would be the first increment of a larger program of improvements to raise and strengthen the levees around the Natomas Basin so as to provide a 200-year level of flood protection to the urban areas of the basin. This program would reduce expected annual damages in the basin by about \$35 million. SAFCA estimates that the cost of the 200-year program, including the cost of the

Phase I Improvements would be \$414 million. At current interest rates, this equates to an annual cost of approximately \$25 million.



**Figure 1 – Project Location**

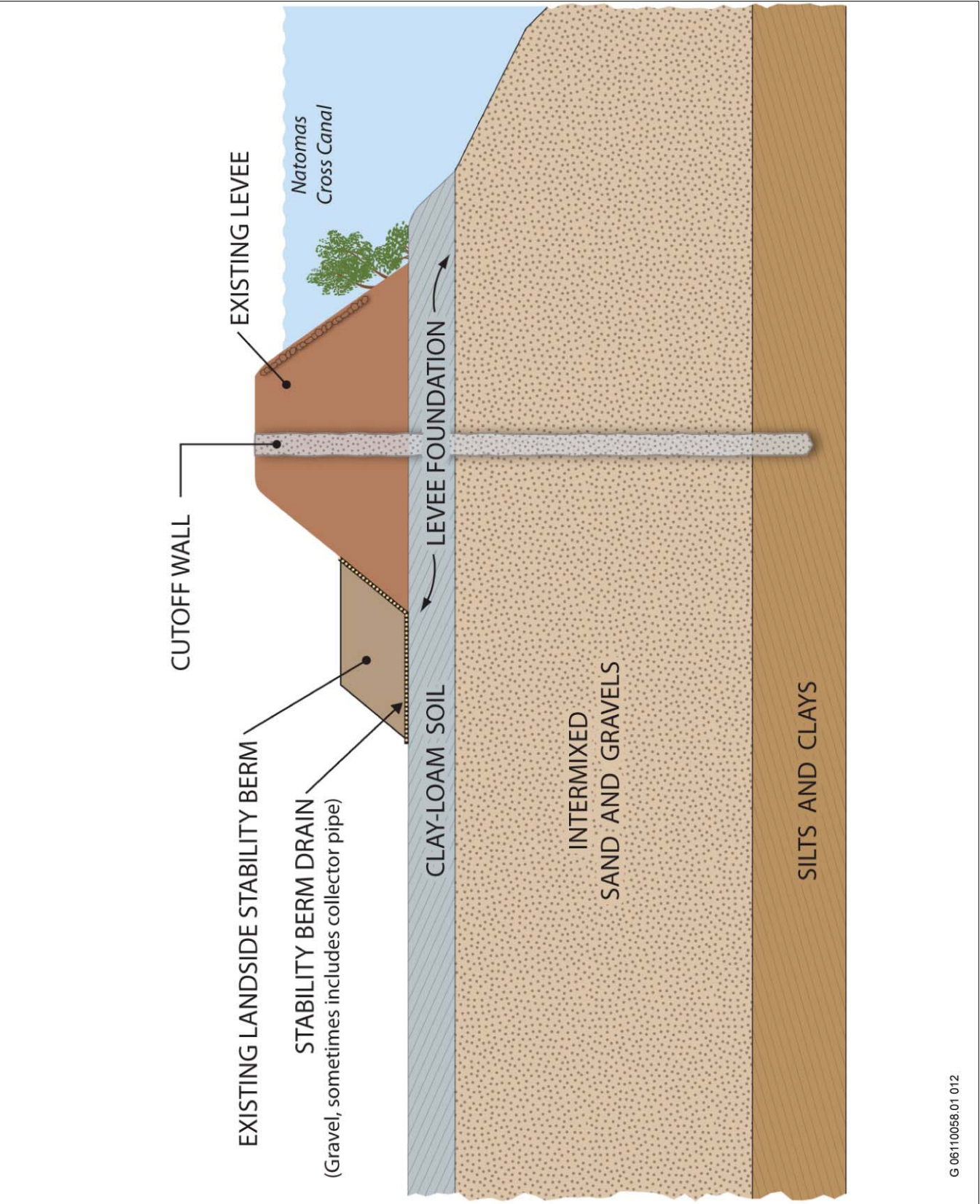


Figure 2 - Typical Cutoff Wall

**Table 2 - Summary of Impacts and Mitigation Measures for  
NCC Phase I Improvement Project**

<b>Resource Topic/Impact</b>	<b>Level of Significance before Mitigation</b>	<b>Mitigation Measure</b>	<b>Level of Significance after Mitigation</b>
<b>Agriculture and Land Use</b>			
Conversion of Farmland to Nonagricultural Uses Resulting from Project Construction	Less than significant	No mitigation is required	Less than significant
<b>Geology and Soils</b>			
Potential Temporary, Short-Term Construction-Related Erosion	Significant	Implement Standard Best Management Practices (BMPs), Prepare and Implement a Stormwater Pollution Prevention Plan (SWPPP), and Comply with National Pollutant Discharge Elimination System (NPDES) Permit Conditions	Less than significant
<b>Water Resources</b>			
Temporary Water Quality Effects from Stormwater Runoff, Erosion, and Spills Associated with Construction	Significant	Implement Standard BMPs, Prepare and Implement a SWPPP, and Comply with NPDES Permit Conditions	Less than significant
<b>Fisheries and Aquatic Resources</b>			
Loss of Fish Habitat Through Increased Sedimentation and Turbidity	Significant	Implement Standard BMPs, Prepare and Implement a SWPPP, and Comply with NPDES Permit Conditions	Less than significant
<b>Terrestrial Biological Resources</b>			
Effects on Sensitive Habitats	Significant	Avoid Sensitive Habitats to the Extent Feasible, Comply with Section 404 and Section 1602 Permit Processes as Needed, and Mitigate on a No-Net-Loss Basis	Less than significant
Effects on Special-Status Plants	Less than significant	No mitigation is required	Less than significant
Effects on Giant Garter Snake	Significant	Identify Habitat, Minimize Potential Impacts, and Mitigate in Consultation with USFWS and DFG as Needed	Less than significant
Effects on Northwestern Pond Turtle	Less than significant	No mitigation is required	Less than significant
Effects on Swainson's Hawk	Significant	Identify Habitat and Nest Locations, Minimize Potential Impacts, Monitor Active Nests during Construction, and Mitigate in Consultation with DFG as Needed	Less than significant
Effects on Special-Status and Other Nesting Birds	Significant	Identify Habitat and Nest Locations, Minimize Potential Impacts, Monitor Active Nests during Construction, and Mitigate in Consultation with USFWS and DFG as Needed	Less than significant

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Effects on Wildlife Corridors	Less than significant	No mitigation is required	Less than significant
<b>Cultural Resources</b>			
Physical Alterations to the NCC Levee	Significant	Document Alterations and Distribute the Information to the Appropriate Repositories	Less than significant
Damage to or Destruction of Previously Undiscovered Cultural Resources	Significant	Suspend Potentially Damaging Activity, Investigate Resources, Avoid to the Extent Feasible, and Conduct Resource Documentation and Data Recovery as Needed	Significant and unavoidable
Discovery of Human Remains during Construction	Significant	Suspend Potentially Damaging Activity, Notify the Coroner and Most Likely Descendant (MLD), and Implement Appropriate Treatment of Remains	Less than significant
<b>Paleontological Resources</b>			
Disturbance of Unknown Unique Paleontological Resources during Earthmoving Activities	Significant	Conduct Construction Personnel Training and, If Paleontological Resources Are Found, Cease Work in the Vicinity of the Find and Implement Mitigation in Coordination with a Professional Paleontologist	Less than significant
<b>Transportation and Circulation</b>			
Temporary Increase in Traffic on Local Roadways during Construction	Less than significant	No mitigation is required	Less than significant
Temporary Increase in Traffic Hazards on Local Roadways during Construction	Significant	Prepare and Implement a Traffic Safety and Control Plan and Implement Measures to Avoid and Minimize Traffic Hazards on Local Roadways during Construction	Less than significant
Temporary Effect on Emergency Service Response Times and Access during Construction	Significant	Provide Pre-Notification of Construction to Emergency Service Providers, and Maintain Emergency Access or Coordinate Detours with Providers	Less than significant
<b>Air Quality</b>			
Temporary Emissions of ROG, NO <sub>x</sub> , and PM <sub>10</sub> during Construction	Significant	Implement Measures and Guidelines of the Feather River Air Quality Management District (FRAQMD) to Control Construction-Generated Emissions of Air Pollutants	Significant and unavoidable
Exposure of Sensitive Receptors to Toxic Air Emissions	Less than significant	No mitigation is required	Less than significant

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<b>Noise</b>			
Generation of Short-Term Construction Noise	Significant	Implement Noise-Reducing Construction Practices; Prepare a Noise Control Plan; and Monitor and Record Construction Noise Near Sensitive Receptors	Significant and unavoidable
Exposure of Sensitive Receptors to or Generation of Excessive Groundborne Vibration or Noise	Less than significant	No mitigation is required	Less than significant
<b>Recreation</b>			
Temporary Changes in Recreational Opportunities during Project Construction	Less than significant	No mitigation is required	Less than significant
<b>Visual Resources</b>			
Changes in Scenic Vistas, Scenic Resources, and Existing Visual Character	Less than significant	No mitigation is required	Less than significant
Changes in Light and Glare	Less than significant	No mitigation is required	Less than significant
<b>Utilities and Service Systems</b>			
Potential Damage of Utility Infrastructure and Disruption of Service during Construction	Less than significant	No mitigation is required	Less than significant
Increases in Solid Waste Generation	Less than significant	No mitigation is required	Less than significant
<b>Hazards and Hazardous Materials</b>			
Potential Creation of a Public Health or Environmental Hazard Through the Presence or Use of Hazardous Materials during Construction	Significant	Prepare a Worker Health and Safety Plan and Implement Appropriate Measures to Minimize Potential Exposure to Hazardous Materials	Less than significant